

BRANCHIAL FISTULA.¹

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THE arrested development theory as to the formation of branchial fistula is based on the facts that during the preliminary stages of development of the embryonic face, ear channels, and alimentary tract, a series of arches and clefts are formed, the clefts being first formed, the arches being merely the thickening of the sides of the clefts. There are two sets,—those placed in front of the mouth to be, and those placed behind the structure. We are now only concerned with the postoral or visceral arches and clefts, five of the former and four of the latter; and of these in speaking of branchial fistula, we need only consider the true branchial arches and clefts. The true branchial arches are the third, fourth and fifth, and the true clefts are the second, third and fourth. A portion of each cleft is used up in the process of development; failure of the complete closure of the remaining portion of either of these clefts, most commonly the third¹ possibly the fourth,² results in a fistulous tract called a branchial fistula. Frequently this does not make itself evident until some time after birth. Such a fistula traverses the tissues of the neck communicating with the pharynx and sooner or later discharges externally. The present day teaching, as to the treatment of a branchial fistula, is to dissect it out thoroughly, and the success of such a proceeding is doubtful; many advise it to be left alone; others say that it is impossible to close the whole track, and by trying to do so the result would likely be closure of the orifice and formation of a cyst. These facts have prompted me to report a case of this congenital abnormality which I have recently successfully treated by croton oil and galvanism, a treatment

¹ Read before the Manchester Medical Society on March 7, 1906.

which I think warrants further trial, for the result of the treatment in this case has been a permanent cure.

On March 16, 1905, a woman, 22 years old, presented herself and examination revealed a fistula extending from the clavicular origin of the sterno-mastoid, at which point it was discharging, to the level of the upper border of the hyoid bone. There was no tumor, hard or soft, either in connection with the fistula or anywhere in the neck. During the treatment it was discovered that there was at least one communication with the pharynx. There was no history to be obtained, except the fact that it had been discharging since she was a child, and that the amount of discharge had increased considerably for the past two or three years. An ordinary probe passed comfortably, and without any pain, into the opening immediately over the origin of the sterno-mastoid, and upwards for $3\frac{1}{4}$ inches, ending, as it seemed, just above the hyoid bone. On extraction of the probe there followed a slight discharge of sero-purulent or sebaceous fluid, but no trace of blood.

Next day I injected through a very small gum-elastie urethral catheter, which was first passed into the fistulous tract, a 1-in-40 phenol solution, and washed the sinus out. Some of the solution entered the pharynx and was spat out. The day following I again syringed it out, and passed and left in place a silkworm-gut drain. On the third day, after having syringed it out, I twisted together and passed four lengths of No. 2 silkworm-gut, having first dipped them in croton oil. I passed them to what I believed to be the upper extremity of the fistula, my object being, of course, to try and destroy the lining mucous-membrane, and in which, it seemed, I to some extent succeeded, judging from the copious discharge of pus there was on the dressings the following day. After two more days of antiseptic syringing and draining I passed to the upper extremity of the fistula a silver-wire electrode bent on itself, the blunt bent extremity being passed into the fistula and the two sharp ends of the other extremity fitted into a handle which was connected with the cathode wire. The current was gradually increased from zero up to 5 milliamperes, and then gradually reduced to zero again. The anode was then made the active electrode on the inside of

the fistula and gradually increased from zero up to 10 milliamperes and reduced slowly to zero again. No drainage was provided for. The next day, and every day for a week, I applied a flat flexible tin electrode to the skin surface immediately over the sinus only. At each application I first made the cathode the active electrode, increasing the strength of the current from zero to from 15 to 20 milliamperes for a few minutes, and then reducing again to zero, after which I made the anode the active electrode in the same way, but reaching from 30 to 35 milliamperes. Before adopting the application of the alternating currents to the external surface of the fistula, there was a discharge from the exit on applying pressure over the course of the fistula, but after four or five days of the external treatment this discharge disappeared, and at the end of the week's application the watery external discharge, produced on application of the cathode as the active electrode, ceased *externally*, but on such application, and at intervals during the day, the patient complained of a bitter fluid discharging into her throat. The applications were continued for another week, up to April 13, with continued good effect. During the two days previous to April 13 the patient only felt the bitter discharge into the mouth once, and that very slightly. The applications were therefore discontinued on that date.

I need not remind you that the cathode, which attracts hydrogen and alkalis, causes, through its irritative and stimulating effect, congestion, softens and liquefies the tissues, causing a watery discharge; and on application of the anode, oxygen and acids are attracted, which have a tonic and astringent effect, harden and dry up the tissues, and cause contraction of the passage, so that if this electrode is left in too long it may be impossible to withdraw it without damaging the adjacent parts.

It has been shown³ that the therapeutic results and chemical changes brought about by a single five minutes séance with a current strength of from one to two milliamperes so alters muscle-structure that evidences of it can be seen for several days after. It seems probable that the interpolar chemical changes set up have caused the cure of this case, possibly assisted by the use of a silver electrode. But I don't think that very much therapeutic effect could be attained from the use of a silver

electrode which ionizes with difficulty as compared to metals such as lead, zinc and copper, although it is recognized that on applying the positive pole there is some movement of silver ions into the tissues, causing the liberation of oxygen and chloride and the formation of insoluble silver chloride.

On April 15 I removed the pharyngeal tonsils, which had been chronically enlarged for some time, causing nasal breathing. I ceased attendance on April 30.

On July 29 I received a report that there was not the slightest sign of the old trouble. I, myself, examined the patient on September 15, and again in January, and with the exception of very slight redness, no bigger than a pin's head, there was absolutely no sign of the trouble.

The treatment as applied in this case carries with it a certain amount of risk, owing to the proximity of important structures, but by exercising a little care the slight risk is, I think, warranted by the result.

There is, I think, no differential diagnosis requisite in this case, for there was no bulging or tumor of any sort in connection.

As the patient has now been a year without the slightest return of the old trouble, I think I am justified in claiming a cure.

This treatment in place of excision might also be applicable to a patent Thyroglossal duct and cyst, a somewhat different state.

REFERENCES.

¹ Chalmers Watson *Encyclopædia Medica*, Vol. 8, p. 240.

² Quain's *Embryology*, Vol. 1. part 1, p. 103, and Mr. Lockhart Mummery in reporting a case before the Society for Study of Diseases of Children.—*B. M. J.*, Nov 4, 1905.

³ *Electro-Physiologie*, "Weiss," p. 127.